



The **CRUSHED STONE JOURNAL**

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By Unusual Interest

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February • 1932



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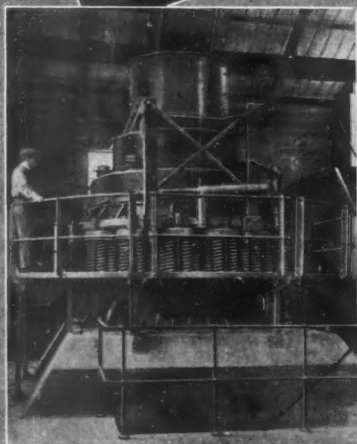
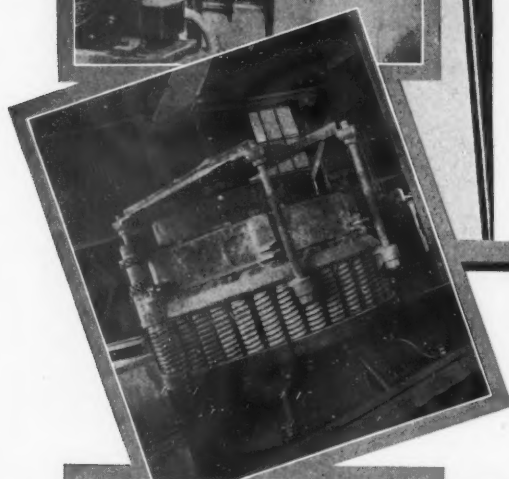
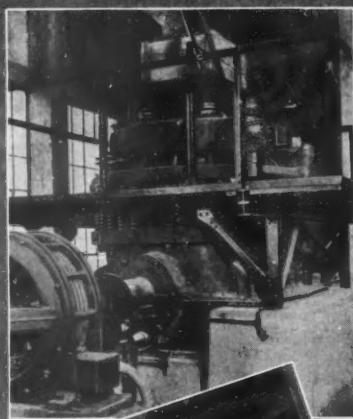
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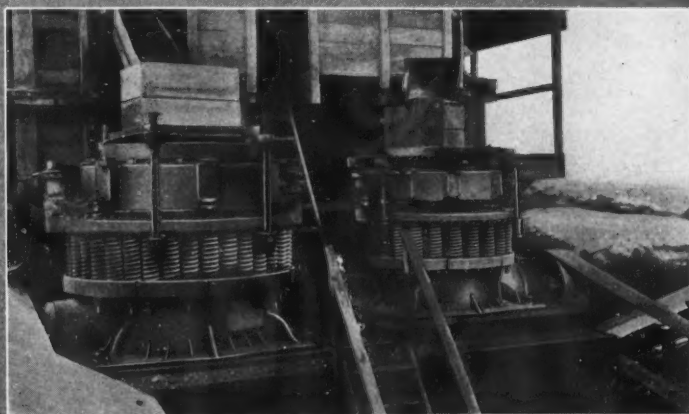
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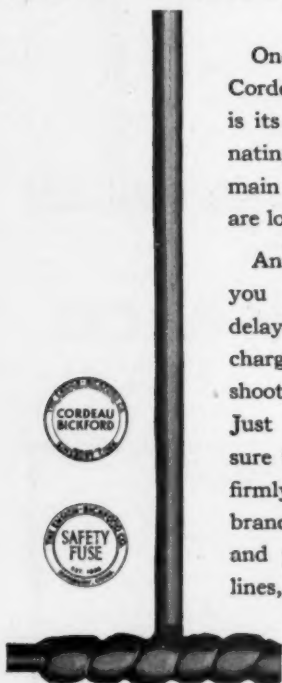


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The Crushed Stone Journal

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J. R. BOYD, Editor

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The Connecticut Quarries Co., Inc.
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Pittsburgh Convention Marked by Unusual Interest

IT IS not possible, through the written word, to effectively convey to those who were not so fortunate as to be present, true appreciation of the enthusiastic approval which was accorded the Fifteenth Annual Convention of the National Crushed Stone Association held at the William Penn Hotel, Pittsburgh, Pa., January 19-22, 1932. Because this annual event is a fitting climax to the activities of the year in the crushed stone industry, it seems appropriate to here record the more important happenings which took place at Pittsburgh during the convention week and which provided for those present one of the most instructive and enjoyable experiences in the history of our organization. Properly speaking, a chronological description of the convention activities would now be in order, but if we may be permitted a slight departure from this accustomed practice, we would prefer at this time to give some of the thoughts which are uppermost in our minds.

In making plans for the Pittsburgh meeting it was realized at the outset that a program of unusual interest and value would have to be arranged if attendance records comparable to those established in previous years were to be maintained. No one will deny that the crushed stone industry, like other industries, has keenly felt the present unfavorable business situation, and it was believed that a program designed more than ever before to be informative and inspiring would have to be evolved if a sufficiently strong appeal were to be made to draw the members of the industry to Pittsburgh for the annual meeting. The attendance at Pittsburgh, to say nothing of the favorable reports heard at the conclusion of the meeting, is sufficient justification for the belief that the program came up to all expectations. The registration was most gratifying, though in truth it should be stated that it did not come up to the records established at the last few conventions. This, however, was to be expected, and it should be a source of pride to the As-

♦ A. L. Worthen reelected President. Registration reaches gratifying total. Exposition continues to be popular feature. Entertainment program receives enthusiastic approval.

sociation to realize that even under present adverse business conditions approximately five hundred persons were in attendance at Pittsburgh to give consideration to ways and means of carrying on during the ensuing year.

One of the most pleasant phases of the entire convention period was the unusual effort put forth by the local group to leave nothing undone which could in any way contribute to the comfort or pleasure of the visiting delegates. The Pennsylvania Stone Producers' Association, our host in Pittsburgh, is deserving of the very highest praise for the truly exceptional manner in which it discharged its difficult obligations. The general committee on entertainment, under the chairmanship of Otho M. Graves, Easton, Pa., was composed, in addition to Mr. Graves, of the following members: Wm. M. Andrews, F. W. Cramer, E. G. Lewis, P. B. Reinhold, E. T. Wolf.

Mr. Graves, with his usual foresight, delegated to Paul B. Reinhold of Pittsburgh much of the detail arrangement and it is largely due to his tireless and unselfish efforts, coupled with his natural ability to handle such matters, that the entertainment program at Pittsburgh has left an indelible and most pleasant impression upon the minds of those who were there. And by no means were the ladies present at Pittsburgh overlooked, for the privilege of assisting them to enjoy our Fifteenth Annual Convention was placed by President Worthen in the capable hands of Mrs. F. O. Earnshaw, as Chairman of the Ladies' Entertainment Committee. Mrs. Earnshaw was effectively assisted in this important assignment by Mrs. Wm. M. Andrews, Mrs. Paul B. Reinhold and Mrs. Bruce G. Shotton.

Mrs. Earnshaw made a charming and gracious hostess and deserves the highest praise and sincere thanks for the many hours which she spent in preparing and executing a program for the ladies which met with such unanimous approval.

For a number of years it has been our good fortune



Otho M. Graves, Chairman of the Entertainment Committee

to hold our annual meeting amidst appropriate surroundings and yet, at least not within the experience of the writer, have we been housed in a hotel better arranged to suit our more or less exacting requirements than was the case at the William Penn. Frank Andrews, Manager of the William Penn, was constantly solicitous of our every need and his attitude was shared by all of the members of his staff.

A detailed description of our Manufacturers' Division Exposition will be given elsewhere in this issue, but it should be pointed out that, though participated in by a somewhat smaller number of exhibitors than was the case at St. Louis a year ago, the exposition was voted an outstanding success and continues to occupy a position of well-merited prominence among the convention activities. The exposition at Pittsburgh was placed in the hotel and set up with less difficulty than has been the case for many years and although the excellent facilities at the William Penn contributed substantially to this, it goes without saying that without capable direction, proper facilities would be of little avail. To Bruce G. Shotton, retiring chairman of the Manufacturers' Division, is due full credit for the efficient installation of the exposition, as he very thoughtfully offered to take over this responsibility. We are grateful for his assistance and congratulate him upon so successfully accomplishing what, under the best circumstances, is a difficult and arduous responsibility.

Many engineers of national reputation; high officials of the Federal Government, as well as of the governments of states and municipalities; and a number of others who have attained prominence in their professions, did us the distinct honor of appearing on our Pittsburgh Convention program, and to them we wish to express our very real appreciation for their presence at the Convention and for the highly interesting and valuable contributions which they made to our proceedings.

It will be recognized that in the following brief description of the convention, it is impossible to go into any great detail because of lack of space. As in the

past, the complete published proceedings of the convention will be printed and distributed as soon as possible, and those articles which seem to be of especial interest will be given in early issues of *The Crushed Stone Journal*.

The Fifteenth Annual Convention of the Association was called to order by President Worthen on Tuesday morning, January 19. Before proceeding with the regular order of business, the assemblage was asked to stand for a moment in silent tribute to the memory of those who had been taken from us since our last annual meeting during January a year ago. It is with a keen sense of loss and distinct sorrow that we record the following names of our departed members.

B. T. Van Camp, President, Van Camp Stone Co., Cincinnati, Ohio.

F. A. Boeye, Vice-Pres. and Gen. Mgr., North American Cement Corp., Baltimore, Md.

C. C. Cartwright, President, Mid-West Rock Products Corp., Indianapolis, Ind.

Joseph McCormick, Joseph McCormick Co., Providence, R. I.

W. J. Black, Gen. Mgr., Moulding-Brownell Corp., Chicago, Ill.

N. S. Greensfelder, Hercules Powder Co., Wilmington, Del.

On behalf of the City of Pittsburgh, the Address of Welcome was made by John S. Herron, President of the City Council, and F. O. Earnshaw, President of the Pennsylvania Stone Producers' Association and President of the Carbon Limestone Co., Youngstown, Ohio, made appropriate reply in his response for the Association. The Presidential Address by A. L. Worthen was the next order of business, and we expect to be able to publish in the next issue of the *Journal* President Worthen's remarks in full. It seems well to point out here, however, that he laid especial emphasis on the value of research. He described the formation of the Association's Research Advisory Committee, inaugurated under his administration, and told the convention of his efforts to establish a Special Research Fund. President Worthen said that of the original sum of \$10,000 set as the amount required, well over half has been definitely pledged and most of this has been collected. In order for the research work to be continued during the present year without curtailment, he stated it is highly necessary for the remainder of the amount to be subscribed, and that especial effort to accomplish this will be made during the present year.

The reports of Directors on business conditions dur-



Paul B. Reinhold, Toastmaster of the Fifteenth Annual Banquet

ing 1931 and the prospects for 1932 were then called for. If it is possible to briefly summarize the consensus of opinion developed from these reports, realizing the wide difference in conditions as they exist in the various sections of the country, we would say that conditions in 1932 are not expected to be worse than 1931 and that in some localities a noticeable improvement is anticipated. Improved business conditions would seem to be premised on more economical production based on a more thorough knowledge of costs and a development of more healthy competitive relations.

Following the opening session, the entire convention came together for the Greeting Luncheon. Arthur S. Lane, Eastern Regional Vice-President and Treasurer of John S. Lane and Son, Inc., Meriden, Conn., presided in a manner both gracious and effective. As the guest speaker we were privileged to hear John S. Fisher, Ex-Governor of Pennsylvania. Ex-Governor Fisher was a pioneer in the good roads movement in Pennsylvania and gave a delightfully entertaining talk which was largely reminiscent of the difficulties experienced in Pennsylvania when the Keystone State was just embarking on its highway program, the development of which has justly entitled it to a leading position in this field of endeavor. As queer as it may seem to us today, Mr. Fisher pointed out that, in the early days, there was much opposition to good roads, and that they were frequently referred to as "the boulevards of the rich." Today it is realized that there are few forms of investment which yield a higher return to the masses of our citizens.

The Tuesday afternoon session, ably presided over by W. R. Sanborn, Northern Regional Vice-President and Vice-President and General Manager of the Lehigh Stone Co., Kankakee, Ill., was largely devoted to two main topics—Low Cost Roads and Research. To afford some relief from such highly technical discussion, we branched far afield and heard from Dr. H. S. Hulbert, famous psychiatrist of Chicago.

The subject of low cost roads is one of increasing interest to crushed stone producers and one of the most important phases of this development is the

problem of reclaiming the thousands and thousands of miles of old macadam roads existent in all sections of the country. Ohio has long been a leader in building macadam types of construction and it was therefore considered most fortunate that we were able to obtain H. P. Chapman, Assistant Director and Chief Engineer

of the Ohio Department of Highways, Columbus, Ohio, to talk to us on "Methods of Reclaiming Old Macadam Roads." Mr. Chapman stated that the problem of widening and resurfacing is one which is becoming increasingly important each year in our highway program. He pointed out that all states, where a program of highway building was embarked upon over ten years ago, are now facing a situation where the main roads are inadequate for present traffic needs. He said that up to 1925 a sixteen-foot pavement was considered adequate for a two-lane traffic and grades and curves were in some cases permitted which could not be tolerated today. He stated that in Ohio, and this must necessarily be true of many of the states of the Union, there are several thousand miles of pavement sixteen feet or less in width and that the method to be employed to bring such highways to the point where they can satisfactorily take care of modern traffic requirements constitutes one of the major engineering problems in the highway field today. Mr. Chapman devoted his paper to a discussion of this important economic need and it should prove a most valuable contribution to our convention proceedings.

Following Mr. Chapman's paper, Dr. H. S. Hulbert, psychiatrist of Chicago, Illinois, who, it will be recalled, gave us a most interesting discussion at our St. Louis Convention, opened an entirely new field of thought to us in his discussion entitled, "Modern Usages of Ancient Inherited Mental Tendencies." Using as the basis for his theme the historical background of mankind, Dr. Hulbert traced in a most fascinating manner the development of ancient mental tendencies of prehistoric origin and ancient historic evolution up to present day conceptions of these characteristics. In conclusion, he said, "And so we are equipped, by our ancestry and by the destiny controlling and guiding human existence, to solve the problems confronting the human race, especially if they be humanly created problems, provided we are adaptable, sane, think in terms of reality and probability, healthy, and make proper use of our inherited instincts, and most especially if we have and use clear concepts of courage and caution, of generosity, and of good sportsmanship."

The remainder of that afternoon was devoted to the topic of "Research," and no more appropriate speaker could be found to open this discussion than Dr. George



Russell Rarey, Presiding Officer at the Wednesday morning session



Arthur S. Lane, who presided at the Greeting Luncheon on Tuesday

D. Beal, Assistant Director, Mellon Institute, University of Pittsburgh. Dr. Beal favored us with a most informative and scholarly address. He directed our attention in a particularly interesting way to the highly important and valuable applications of scientific research to modern industry. Dr. Beal brought out the



W. W. Duff, Chairman of the session for Operating Men, Superintendents and Manufacturers

significant fact that of some 205 organizations that reported balance sheets on the right side for the past year, sixty per cent attributed their success to properly planned and executed scientific research. Because of the recent establishment of our own Research Advisory Committee, we should be encouraged in the belief that we are on the right track by the following comments made by Dr. Beal: "All these activities (meaning research activities) and their results are best carried on through an association committee of specialists, that acts in an advisory capacity to the research workers and controls the release of research information to the association membership and to the public. * * * The laying out of a research program for a trade association is a real test of the bonds that hold an association together and of the feelings that first prompted individual members to join the association. Every association is composed of members having very similar problems in the same field of industry. As competitors they must nevertheless bring not only their adequate financial support but their cooperative support as well. They must be prepared to share with one another the developments of the laboratory, each trusting to his own superior managerial skill to give him a commanding lead in the market that is to follow. But in addition each must be prepared to contribute not only from his own purse, but from his own information and experience as well." Dr. Beal has a valuable message for every member of this Association and we earnestly suggest that his paper be given a careful and thoughtful reading when it is available in the published proceedings of the Pittsburgh Convention.

Following Dr. Beal, P. B. Reinhold, Chairman of the Research Advisory Committee of the Association, briefly described "The Activities and Program of the Research Advisory Committee." Mr. Reinhold pointed out that the general committee consists of seventeen sub-committees, each designed to study and collect information on separate and distinct problems relating

to the use or production of crushed stone. He stated that these various sub-committees had done most commendable work during the past year and are deserving of the sincere appreciation of the entire industry. He pointed out that the work of the Bureau of Engineering and the research activities carried on under its jurisdiction constitute the most important field of endeavor in which the Association could work, and that the whole-hearted support of the membership should be forthcoming during the present year.

The discussion which immediately followed Mr. Reinhold's talk was opened by A. T. Goldbeck, Director of the Bureau of Engineering of the National Crushed Stone Association. In commenting on the Research Advisory Committee, Mr. Goldbeck stated that one of the chief functions of this committee is to keep the Bureau of Engineering advised as to what researches it should undertake. He said that at the beginning of the year the Research Advisory Committee suggested three major problems, as follows—Railroad Ballast, Stone Sand for Use in Concrete, and the third and most important in the opinion of the Committee, Low Cost Roads. Mr. Goldbeck pointed out that an investigation on the question of the stability of railroad ballast as affected by the type and gradation of the aggregate had been concluded and a report prepared which had been published in the November, 1931, issue of *The Crushed Stone Journal*. As for the investigation on stone sand, he said that this had been under way for a number of months. At first there was some question as to how this investigation should be undertaken and it was finally decided that the best procedure would be to use a theory which had been evolved by Profs. Talbot and Richart of the University of Illinois, known as the mortar voids theory. A large amount of preliminary work was devoted to the design of mixtures with stone sand to be used in making the concrete graded in seventeen different ways. To design these different mixtures using stone sand in such a way as to obtain concrete of approximately the same beam strength or modulus of rupture proved to be a laborious undertaking. Mr. Goldbeck then illustrated the results of this investigation by means of slides. It is expected that a full report will be available in the near future.

In discussing the third investigation, that of Low Cost Roads, Mr. Goldbeck pointed out that the aggregate which would be dealt with would extend perhaps from 2 to 2½ inches down to a rather small size, and that in considering the tests which were available for determining the stability of this type of mix, it was found that there seemed to be no test which satisfactorily answered the various requirements. It then became necessary to design a machine which would develop the information desired. This apparatus consists of a circular track, about sixteen feet in diameter which has been built in the Association's laboratory in Washington. He then explained the various details of

design and construction of the circular track by means of lantern slides. It is expected that at least two major problems will be studied by means of the circular track, one of which has to do with the development of stone sand, or screenings, for use as an aggregate in asphalt mixtures, and the other has to do with the characteristics of various kinds of aggregates for use in coarser types of bituminous mixtures, with the idea of developing the best gradation and the relative merits of the various types of coarse aggregate. Mr. Goldbeck concluded his discussion with the statement that in addition to the three major researches previously referred to, a number of other problems had been studied in the laboratory from time to time. The question of the soundness of materials, he pointed out, is of great importance to the crushed stone industry, and will be the subject of further study in the laboratory at a future date.

Following the custom which was established last year and which met with such genuine approval, all of Tuesday evening was devoted to an inspection of the Manufacturers' Division Exposition of Quarry Equipment and Machinery. The exposition was formally opened at 7:30 p. m. with appropriate ceremonies and from then until closing time was decidedly the center of attraction. No further space will be given to the exposition at this time, as a complete description of each exhibit is given elsewhere in this issue.

The Wednesday morning session of the convention was called to order by Russell Rarey, acting Central Regional Vice-President and Vice-President, Sales, of the Marble Cliff Quarries Co., Columbus, Ohio. It will be remembered that at the convention held at Cincinnati Mr. Rarey was given the responsibility of being toastmaster at the annual banquet, and that his task was made doubly hard because of a throat ailment which made it almost impossible for him to talk. Fortunately he was suffering under no such handicap at Pittsburgh, and the commendable manner in which he presided on Wednesday morning makes us realize more keenly than before his excellent capabilities as a presiding officer.

At almost any time or place where highway or materials engineers are gathered together one finds that the discussion will inevitably lead to the question of durability of concrete. This is one of the most important and perplexing problems of the present day. It is therefore doubly important that we keep advised as to current developments. Few men in this country are better qualified to discuss the subject, "The Effect of Coarse Aggregate on the Durability of Concrete" than is P. J. Freeman, Chief Engineer, Bureau of Tests and Specifications, County of Allegheny, Pittsburgh, Pa. Mr. Freeman entirely justified our decision to have him open the Wednesday morning session, by giving us a discussion of unusual interest. He expressed the belief that the year 1932 will be a difficult one for the aggregate producers and pointed out that

the lull in construction activities has given materials engineers time to do a large amount of research and that a natural reaction to this condition will probably be the writing of more stringent specifications. He called attention to the many reports appearing of late months in the technical press on the subject of durability. Undoubtedly the many researches being conducted by various investigators on this subject will ultimately promote the production of better concrete, but in the meantime Mr. Freeman cautioned us to be on the lookout for trouble. He stated that the work of the various committees engaged on projects of this nature is being published, and that he was fearful that some engineers will be inclined to take theories for facts and assume that the reports of tests made on certain materials can be applied to materials in general. He felt that this might lead to a large amount of aggregates which would be quite suitable for making concrete being classed as "unsound." Mr. Freeman pointed out that the crushed stone industry is fortunate in having established a research testing laboratory under the direction of an engineer whose technical standing as a testing engineer is of the highest rank and he suggested that when our members are confronted with troubles in connection with durability that they pass them on to Mr. Goldbeck, provided, however, that the materials are actually durable and suitable for use in concrete. Mr. Freeman stressed the desirability of knowing something of the service behavior of materials whose durability is questioned. He illustrated his talk with a number of very interesting slides and we should certainly feel indebted to Mr. Freeman for his friendly advice.

We have been privileged to include H. S. Mattimore, Engineer of Tests and Materials Investigation, Pennsylvania Department of Highways, on many of our convention programs when we were not meeting within the environs of the Keystone State. Therefore, with our convention being held in Pennsylvania, it was only natural that we should desire to hear from him again. Immediately following Mr. Freeman's paper, Mr. Mattimore discussed "The Trend in Specifications for Crushed Stone" and we certainly appreciated his valuable and timely discussion. Mr. Mattimore pointed out that in his opinion there are two vicious types of specification, one the extremely indefinite type and the other which calls for practically the impossible. He pointed out that fortunately these two types of specifications are rapidly disappearing. After discussing the trend in specifications covering materials used in concrete construction, he spoke with regard to specifications in bituminous work, emphasizing the fact that to date no attempt has been made to consider the type of bituminous material to be used. Mr. Mattimore stated that in different types of bituminous materials different gradings of aggregates are required, or that certain materials, like emulsions and tars, require rather a tight surface with excessive fines, while the

In Appreciation

THE National Crushed Stone Association, in convention assembled at Pittsburgh, during the week of January 19, 1932, extends its hearty thanks to the Entertainment Committee and to our hosts, the Pennsylvania Stone Producers' Association, for their abounding hospitality.

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The National Crushed Stone Association, in convention assembled at Pittsburgh, during the week of January 19, 1932, extends the most cordial gratitude to Mrs. F. O. Earnshaw and her associates of the Ladies' Entertainment Committee for the graciousness and charm which has added so much to the pleasure of ourselves and our families.

■

The National Crushed Stone Association as a whole wishes to congratulate our fellow members of the Manufacturers' Division upon their interesting and instructive exposition and to express our strong sense of appreciation for their stalwart adherence to the Association of which they are so important a part.

■

The National Crushed Stone Association rests under a sense of great obligation to Mr. Paul B. Reinhold and to the other members of the Research Advisory Committee for their valuable assistance to and cooperation with the Bureau of Engineering and strongly advocates the continuance in office of this committee and its useful services.

■

The National Crushed Stone Association, in convention assembled in Pittsburgh, during the week of January 19, 1932, takes occasion to thank Mr. Scott Turner, Director of the U. S. Bureau of Mines, for emphasizing the value and importance of the accident prevention work of the Association by presenting in person the safety trophy for 1930 to the Cape Girardeau Limestone Quarry of the Marquette Cement Manufacturing Company, and to congratulate this company individually and collectively upon its admirable record.

asphalt will require a more open mix and that now recognition is being taken of this in specifications. The producer of crushed stone will find much helpful information in Mr. Mattimore's article and we strongly recommend its reading and study when it is made available to the membership.

What to do with surplus fines has been a matter of growing and real concern to crushed stone producers for many years and an engineer, or in fact anyone, who could throw some real light on this subject would be rendering the crushed stone industry a distinct service. L. M. Dow, Designing and Supervising Engineer for the Henley Street Bridge, Knoxville, Tennessee, and Robert L. Fox, City Engineer of Bethlehem, Pennsylvania, undertook this difficult task and discharged it in admirable fashion. Following Mr. Mattimore's paper, Mr. Dow described in considerable detail the use of stone sand in the construction of the Henley Street Bridge at Knoxville, Tennessee. The difficulties encountered in persuading those in authority to permit the use of stone sand and the arguments advanced to overcome these objections should be of inestimable value to our industry in establishing the use of this material as a fine aggregate in concrete construction. Mr. Fox has for some time been favorably inclined towards the use of stone sand, and he has obtained excellent results in construction work for the City of Bethlehem. To ascertain the extent to which stone sand is used and the experience of others in connection with its use, Mr. Fox sent a questionnaire to highway departments in twenty-nine states and the answers to this questionnaire constitute one of the most valuable sources of information on record with regard to this newly developing field. Of such basic importance is the information given by Mr. Dow and Mr. Fox that it is planned in the immediate future to publish their two articles, supplemented by results obtained in our own research laboratory, in the columns of *The Crushed Stone Journal*. We know that publication of this material will mark a definite step forward in the interests of extending to more general use what we believe is destined to be a valuable by-product of our industry.

The last speaker on our Wednesday morning program needs no introduction to the convention, for it has been our pleasure for a number of years to receive helpful and inspiring messages from Charles M. Upham, Engineer-Director of the American Road Builders' Association. His subject, "A Plan for Stabilizing the Highway Building Program," was opportunely chosen, perhaps even more so than he himself realized at the time, as subsequent developments have proven. There is a growing public sentiment towards curtailment of government expenditures and it seems inevitable, unless drastic preventive measures are resorted to, that the highway building program will seriously suffer and possibly out of all proportion to what might

be justified on the basis of needed economies. Therefore any proposal which looks towards the stabilization of the highway building program deserves our immediate and thoughtful consideration. Mr. Upham devoted a large proportion of his talk to a survey of the present situation in the highway building field as it affects the programs in Federal, state, county and municipal jurisdictions and stated that the time is not at hand to permit any serious curtailment of highway expenditures. He briefly described the recent formation of the Advisory Conference on Highway Stabilization, composed of some eighteen organizations directly or indirectly interested in the highway construction field, whose chief objective will be, as its name implies, the stabilization of the highway program. At the first meeting of the conference, Mr. Upham stated, it was decided to give immediate attention to the question of gas tax diversion. It is the plan of the conference that all possible information on this subject be collected, presented to the Conference, discussed, rewritten and after being approved by the Conference, sent back to the individual member organizations to be disseminated in a manner which best meets their respective needs. Mr. Upham's complete paper will be given in an early issue of *The Crushed Stone Journal* and we know it will need no urging on our part to persuade the crushed stone industry to lend every possible effort towards carrying out the objectives of the Advisory Conference on Highway Stabilization.

On Wednesday afternoon the convention divided into two simultaneous sessions, one consisting of a meeting of cost accountants and the other devoted to problems confronting the salesmen in the crushed stone industry. The first of these groups was a small, informal one, whose main topic was a general discussion of the Association's Manual on Uniform Cost Accounting. No formal papers were presented and the information developed at this conference was incorporated in Mr. Hilliard's report to the convention as Chairman of the Committee on Uniform Cost Accounting.

The Sales Group was presided over by J. A. Rigg, Secretary-Treasurer and General Manager of the Acme Limestone Co., Alderson, W. Va. The program opened with a talk by A. T. Goldbeck, Director of the Bureau of Engineering of the Association, under the title, "Do You Know?" Mr. Goldbeck's chief objective was to acquaint the salesmen, in non-technical language, with some of the more important considerations with which they should be familiar if they are to successfully sell crushed stone and be able to answer intelligently inevitable questions with regard to the physical characteristics of their material and its relative merits. Mr. Goldbeck pointed out that the salesman desires to create a want for his product and to that end he must know why it should be used. He must be familiar with its strong points, limitations and the results it will produce when used in different ways. He must know

all of its possibilities, said Mr. Goldbeck, in order that he may be able to justify it. It is a mistake for the salesman to be merely content to quote prices and freight rates and the daily tonnage which his plant might be able to ship to the job. Mr. Goldbeck stressed the importance of the salesman's knowing something of the physical properties of his material, such as the percentage of wear, specific gravity, toughness, absorption, hardness and sodium sulphate test and also that he be familiar enough with the general classification of his rock to know whether it is of igneous, sedimentary or metamorphic origin. He felt that it is desirable for the salesman to know its family name, that is, whether it is a basalt, dolomite, granite, or other classification. Mr. Goldbeck gave a brief description of the physical concept of concrete and demonstrated how important it is to the salesman to be able to determine the "yield." Other factors which he felt should be thoroughly understood by salesmen included beam tests of concrete, workability, shrinkage of concrete, fire resistance, permeability, effect of dust coated stone, effects of unsound stone, flat and elongated pieces, stone sand as a fine aggregate in concrete, and finally the inherent stability of crushed stone. Mr. Goldbeck's talk should prove extremely helpful to salesmen for it gives in concise and understandable language much of the information which they are called upon to know in their daily work.

Following the talk by Mr. Goldbeck, the subject, "The Advantages of a Uniform Sales Contract," was presented by John Rice, Jr., Vice-President, Sales, General Crushed Stone Co., Easton, Pa. Mr. Rice called attention to the laxity with which crushed stone producers have handled their sales. He stated that many contract forms, which have been used and are still in use by such producers, contain terms that would not be legally accepted and afford neither themselves nor the buyers adequate protection. Verbal orders involving thousands of tons of stone have been taken by producers who trusted entirely to luck that the buyer would be successful in his work. No large or well-known concern today, in Mr. Rice's opinion, would countenance the careless basis on which orders for stone are accepted by crushed stone producers. In reply to the question, "What is a good uniform sales contract?", he answered that it is one that is agreeable to all of the producers in a particular locality, legal in respect to the existing statutes, fair in respect to its demands on the buyer and sincere in its guarantee to perform satisfactory service and supply material that will adequately meet specifications. It cannot be one-sided, for it must afford adequate protection to both buyer and seller, in order to be successful. Mr. Rice then gave a detailed explanation of the uniform sales contract recently adopted by the Pennsylvania Stone Producers' Association and the New York State Crushed Stone Association. He concluded with an enumera-

tion of the advantages to be obtained from a uniform sales contract and stated that unless an operator is willing to have his business conducted along careless and reckless lines, he should further investigate such contracts now in use.

In opening the discussion on this subject, Mr. Ellwood Gilbert, Secretary and Sales Manager, New Castle Lime and Stone Co., New Castle, Pa., heartily subscribed to the thoughts expressed by Mr. Rice. Mr. Gilbert laid particular emphasis on what he considered to be two of the principal advantages of a uniform sales contract. First, he said that all buyers in a particular territory will be subject to identical terms of sale. This will have the effect, if the terms of sale are adhered to consistently, of rather quickly eliminating from the field of prospective buyers the financially irresponsible and financially unqualified contractor. The second advantage which Mr. Gilbert emphasized was that when the terms are the same for all buyers in a particular locality, this condition has a real tendency to stabilize prices. The uniform sales contract has passed the experimental stage and would seem to offer so many advantages to crushed stone producers that its general acceptance should be urged. We are certainly indebted to Mr. Rice and Mr. Gilbert for their clear and concise handling of this important subject and we hope that their suggestions will be given trial in other sections of the country.

Although scheduled for presentation at the Sales Problems Session, the subject of "Truck Delivery and Its Responsibilities" by John B. Lockhart, Attorney of New Castle, Pa., and the discussion which followed, led by Quincy McBride of the Aetna Insurance Co., New Castle, Pa., were of much more general interest than their location on the sales program might indicate. No crushed stone producer can afford to remain in ignorance of his responsibilities when he is required to deliver crushed stone by truck which is furnished by him under contract to the user of the material. In many instances the requirements of the purchaser of material call for the delivery and distribution of the material on a roadway under construction and in cases where the plant of the material man is located at too great a distance from the construction work, it necessitates the employment of truckmen or trucking concerns to transport the material from the destination of railroad shipment. And where the construction is within trucking distance from the plant of the successful bidder, material is transported direct from the plant and delivered on the highway under construction. The question then arises, says Mr. Lockhart, as to what legal responsibilities and liabilities arise out of the relationship established when it is necessary to hire trucks to do this work. Mr. Lockhart directed his remarks to the public liability of the material man and his liability under the compensation laws. By means of actual examples and hypothetical cases he

clearly set forth the position confronting the material producer under varying conditions and his paper should do much to untangle the confusion existing in the minds of many producers on this important subject. Mr. McBride followed Mr. Lockhart's paper with an able discussion, with particular reference to various circumstances under which the material producer would be subject to liability. Casual conversation with a number of our members leads us to the belief that many producers feel they are amply protected when as a matter of fact quite the contrary is true. A careful study of the papers presented by Mr. Lockhart and Mr. McBride should prove very much worth while.

Describing the entertainment for Wednesday evening, which was planned and presented through the courtesy of the Pennsylvania Stone Producers' Association, it was stated in the official convention program, that "Pennsylvania Night" would be a distinctly different evening and no truer words were ever spoken. Held amid surroundings which were distinctly reminiscent of the "gay nineties" "Pennsylvania Night" proved to be one of the most delightfully entertaining evenings which it has been the good fortune of our members to enjoy for many years. The entertainment which had been secured was of exceptional merit and this, coupled with the spirit of friendliness and camaraderie which is present on such occasions, made an evening which will long be a memorable one. The Pennsylvania producers are to be highly commended for discharging their responsibility as hosts in so commendable a manner. And to Otho M. Graves, General Chairman of the local entertainment committee, and P. B. Reinhold, under whose immediate supervision the program was planned, a sincere vote of thanks is due.

The Pennsylvania Stone Producers' Association, never unmindful of the ladies, arranged for them a theatre party which was held coincident with "Pennsylvania Night." Eugene O'Neill's much talked of play, "Mourning Becomes Electra," was the current stage offering and seemed to be thoroughly enjoyed by the ladies who were present.

The third general session of the convention was opened on Thursday morning with Otho M. Graves, President of the General Crushed Stone Co., Easton, Pa., occupying the chair. Mr. Graves graciously consented to preside in the place of John Prince, President of the Stewart Sand and Material Co., Kansas City, Mo., who had previously accepted this responsibility, but because of last minute developments was prevented from being present at the convention.

A newly developing field for crushed stone which is deserving of the attention of the industry is that of airport construction, and it was particularly pleasing to the Association officers when Fred. E. Swineford, Chief Engineer, Ohio Crushed Stone Association, consented to present a paper entitled "Airport Pavement Re-

quirements." In opening his paper Mr. Swineford emphasized the potential market which exists for crushed stone in the construction of airports. He pointed out that commercial air transportation has developed during the past ten years to such magnitude that both cities and private companies have found it necessary to provide adequate ground and terminal facilities for aircraft. Consequently, he said, over fifteen hundred airports have been established throughout the United States. The Aeronautics Branch of the Department of Commerce, with the cooperation of the American Engineering Council and the American Road Builders' Association, said Mr. Swineford, has just completed a report on airport drainage and surfacing. Information has been compiled by this group from over one hundred well known airports throughout the country. Their report gives the ideal requirements for airport landing areas. In a most thoughtfully prepared paper Mr. Swineford outlined the more important facts presented in this national survey, supplemented by his personal observations of thirty outstanding airports located from coast to coast. It behooves our industry to study well the information given in Mr. Swineford's discussion, for it seems obvious that airport construction offers us a potential market of no mean magnitude.

For many months this country has been in the throes of an economic depression. Suggestions innumerable have been offered as to the cause as well as to what the cure may be. It fell to Gerard Swope, however, President of the General Electric Co., Schenectady, N. Y., to startle the business world with his proposal for business stabilization, presented at the meeting of the National Electrical Manufacturers Association held at the Hotel Commodore, New York City, on September 16, 1931. No one will deny the acute need for business stabilization, but a great difference of opinion exists as to the best means of accomplishing it. No industry can afford to be ignorant of the developments which are gradually taking shape, looking towards the prevention of future business depressions, and it was largely with this thought in mind that Dr. Ralph J. Watkins, Director of the Bureau of Business Research, University of Pittsburgh, was asked to address us on the subject, "The Swope and Related Plans for Business Stabilization." Obviously space will not permit a detailed description of Dr. Watkins' discussion, but in passing we do wish to say it was most illuminating and opens a wide field for thought. It will shortly be printed in full and merits the careful study of our entire industry.

As a means of assisting in business stabilization the sales merger offers possibilities, and we were especially fortunate in being able to get Gilbert H. Montague, Attorney-at-Law of New York City, who has had close contact with this problem as it relates to another industry, to discuss it from our point of view.

(Continued on page 17)



Fifteenth Annual Banquet of the National Crushed Stone Association



tion held at the Hotel William Penn, Pittsburgh, Pa., January 21, 1932.

Gasoline Tax Diversion

WHEREAS, The gasoline tax derived from the uses of roads was created for the extension and completion of the highway program, and

WHEREAS, The voters of the States have willingly accepted this form of taxation with the understanding or belief that it was to be used for road and street purposes, and

WHEREAS, At the present time there is a tendency in some parts of the country to divert this tax from the purpose for which it was originally intended and use it for purposes absolutely foreign to the construction and maintenance of roads and streets, and

WHEREAS, If there is increasing diversion of the gasoline tax and automobile revenue, it will greatly interfere with the completion and extension of the highway system, thus retarding the development of economic means of communication and transportation, and

WHEREAS, The gasoline tax and automobile revenue, which is secured from the use of the highways constitutes the principal source of funds for highway improvement, now therefore be it

RESOLVED, By the National Crushed Stone Association, assembled in Pittsburgh, January 19-22, 1932, that it is opposed to the diversion of gasoline tax and automobile revenue for purposes other than roads and streets, and be it further

RESOLVED, That the National Crushed Stone Association urge its members and allied associations, to give this resolution wide publicity.

Continuance of Highway Program

WHEREAS, In some localities there is a tendency towards a recession in the construction and maintenance of highways, and

WHEREAS, The normal yearly demand for this construction has not been reached, and

WHEREAS, Economic transportation is hampered by lack of improved highways, and

WHEREAS, There will be great economic loss if any recession of the highway program occurs, and

WHEREAS, It has been conclusively shown that highway construction and maintenance is one of the best means of economically and usefully relieving the present unemployment problem, now therefore be it

RESOLVED, By the National Crushed Stone Association, assembled in Pittsburgh, January 19-22, 1932, that for the best interests of the general economic condition of the nation, there should be no interruption in the highway program and that county, city and federal officials be urged to maintain or increase their present program, and be it further

RESOLVED, That any recession in the highway program at this time would be false economy resulting in increased transportation costs and prolonged unemployment.

Federal Aid for Highway Construction

WHEREAS, Federal aid in highway building has been a practical incentive in the extension and early completion of highway programs, and

WHEREAS, Federal aid has been an important factor in improving the standards of highway construction and maintenance, it is

RESOLVED, By the National Crushed Stone Association, assembled in Pittsburgh, January 19-22, 1932, that Federal authorization for highway building should be continued at the rate of at least one hundred and twenty-five millions each year, and further be it

RESOLVED, That, inasmuch as highway work can be wisely and economically administered by the road building agencies already in existence, and inasmuch as road construction and maintenance serve as one of the best possible aids in the relief of unemployment, that an emergency fund similar to the one authorized by Congress for 1931 should again be authorized and expended, and that the amount should be at least one hundred million dollars.

The discussion which was stimulated by Mr. Montague's remarks is ample testimony of the interest which his paper aroused. Following Mr. Montague, we were again privileged to hear from our old friend, Harold Williams, on the subject of "Business Stabilization and the Anti-Trust Laws." It is no exaggeration to say that these three talks, constituting, as they did, a symposium on business stabilization, represented one of the high lights of the convention.

In the last formal paper on the Thursday morning program, Wm. E. Hilliard, General Manager of the New Haven Trap Rock Co., New Haven, Conn., spoke on the subject, "Why Adopt the Association's Uniform Cost Accounting System?" Mr. Hilliard gave a most interesting and convincing discussion in which he urgently appealed to the membership to more generally adopt the system of cost accounting set forth in the Association's Manual on Uniform Cost Accounting. When every effort is being made to curtail expenses and place operations on a more economical basis, it would seem obvious that one of the first steps in this direction would be to have accurate information with regard to costs. Uniform cost accounting is one of the most important factors in rehabilitating business and we earnestly suggest that the industry take very much to heart the excellent advice of Mr. Hilliard, the Chairman of our Committee on Uniform Cost Accounting.

The session on Thursday morning concluded with the election of officers for the ensuing year. The report of the Nominating Committee, made by Otho M. Graves, Chairman, was unanimously accepted and on motion of W. L. Sporborg, Syracuse, New York, seconded by F. H. Edwards, New Haven, Conn., the following officers and members of the Board of Directors were duly elected:

President—A. L. Worthen, The Connecticut Quarries Co., Inc., New Haven, Conn.

Regional Vice-Presidents—

C. M. Doolittle, Canadian Region, Canada Crushed Stone Corp., Hamilton, Ont., Canada.

E. Eikel, Southwestern Region, Servtex Materials Co., New Braunfels, Texas.

A. S. Lane, Eastern Region, John S. Lane and Son, Inc., Meriden, Conn.

W. R. Sanborn, Northern Region, Lehigh Stone Co., Kankakee, Ill.

Russell Rarey, Central Region, Marble Cliff Quarries Co., Columbus, Ohio.

T. I. Weston, Southern Region, Weston and Brooker Co., Columbia, S. C.

A. J. Wilson, Western Region, Granite Rock Co., Watsonville, Calif.

Porter W. Yett, Northwestern Region, City Motor Trucking Co., Portland, Oregon.

Board of Directors—

A. L. Worthen, New Haven, Conn., Chairman.

Max A. Altgelt, New Braunfels, Texas.

W. M. Andrews, Youngstown, Ohio.

H. E. Billman, St. Louis, Mo.

A. J. Blair, Milwaukee, Wis.

L. J. Boxley, Roanoke, Va.
C. D. Brewer, Duluth, Minn.
O. P. Chamberlain, Chicago, Ill.
J. E. Cushing, Schenectady, N. Y.
C. M. Doolittle, Hamilton, Ont., Canada.
F. O. Earnshaw, Youngstown, Ohio.
E. Eikel, New Braunfels, Texas.
Otho M. Graves, Easton, Pa.
F. T. Gucker, Norristown, Pa.
George Hammerschmidt, Chicago, Ill.
J. L. Heimlich, LeRoy, New York.
W. E. Hilliard, New Haven, Conn.
E. J. Krause, St. Louis, Mo.
A. S. Lane, Meriden, Conn.
Thos. McCroskey, Knoxville, Tenn.
B. A. McKinney, West Roxbury, Mass.
F. R. Patterson, Findlay, Ohio.
John Prince, Kansas City, Mo.
Russell Rarey, Columbus, Ohio.
John Rice, Easton, Pa.
J. A. Rigg, Alderson, W. Va.
H. E. Rodes, Nashville, Tenn.
W. R. Sanborn, Kankakee, Ill.
James Savage, Buffalo, N. Y.
F. W. Schmidt, Jr., Morristown, N. J.
J. F. Schroeder, Davenport, Iowa.
W. L. Sporborg, Syracuse, N. Y.
John W. Stull, Rocky Point, Va.
Mortimer Wandell, New York City.
T. I. Weston, Columbia, S. C.
G. J. Whelan, Cleveland, Ohio.
A. J. Wilson, Watsonville, Calif.
W. F. Wise, Dallas, Texas.
Porter W. Yett, Portland, Oregon.
Representing Manufacturers' Division—
Abe Goldberg, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
B. G. Shotton, Hendrick Mfg. Co., Pittsburgh, Pa.
L. W. Shugg, General Electric Co., Schenectady, N. Y.

In reporting for the Nominating Committee, Mr. Graves, placing the name of A. L. Worthen in nomination for reelection to the presidency, commented as follows: "The Committee gave serious thought, naturally, to the nomination that it would propose for President of the Association. There was a complete and absolute accord and unanimity of thought. We recognized the untiring efforts of our present President and the Nominating Committee believes that it shares with you not only the highest regard for the work Mr. Worthen has done, but it has grown to regard him more affectionately than ever before. We have admired the qualities of character that make him an unusual leader. We like his unassuming modesty; we like his unaffectedness, which do not, however, in the least impair the earnestness and zeal with which he works and the steadiness of his purpose. Mr. Worthen was reluctant to continue in office and he has felt this year, as others who have served in that capacity have felt also, that it took far more time than he expected, and yet he felt that if there was no other reasonable or feasible alternative that he would make the sacrifice for another year."

Past Presidents W. F. Wise and E. J. Krause acted as a committee of honor to escort Mr. Worthen to the

platform and in accepting the presidency for the coming year he spoke as follows: "Gentlemen, I appreciate this expression of confidence and the honor which you confer upon me by reelecting me your President for another year. This year has been an enjoyable one to me in spite of the few discouragements which



Scott Turner, Director, United States Bureau of Mines, who presented the safety awards at the annual banquet

have occurred during it. I have always been an enthusiastic believer in this Association and its possibilities and I think this year as President has increased that enthusiasm if it were possible to do so. I have also discovered the loyalty with which the members of this Association stand back of the man who is for the time at its head, particularly during a year of adversity such as this was. And it is with this knowledge of the loyalty of you fellows that I look forward to the coming year with a great

deal of pleasure, and I think I can say confidence."

Again on Thursday afternoon, the convention divided into two simultaneous sessions, the first devoted to Operating Men, Superintendents and Manufacturers and the second to a meeting of the National Agricultural Limestone Products Association. The session for Superintendents, Operating Men and Manufacturers spent much of its time in a consideration of "Some Fundamental Considerations in the Preparation of Clean Stone." This discussion was introduced by A. T. Goldbeck and papers followed on "Methods of Washing Stone" by Harry H. Brandon, C. C. Beam, Inc., Melvin, Ohio, and H. W. Craig, The John T. Dyer Quarry Co., Norristown, Pa. "Other Methods of Cleaning Stone" was the subject discussed in a paper presented by F. W. Schmidt, Jr., North Jersey Quarry Co., Morristown, N. J. The preparation of clean stone is a very serious problem to many producers and we believe that the Pittsburgh discussion of this subject will prove of very real assistance.

Following the talks on the factors entering into the production of clean stone, W. E. Farrell, President, Easton Car and Construction Co., Easton, Pa., gave a paper entitled, "From Quarry Face to Crusher." Mr. Farrell has made an intensive study of transportation problems in quarries and his observations should be of distinct interest to quarry superintendents. The session concluded with an open forum which was participated in by a number of those present.

The meeting of the National Agricultural Limestone Products Association was presided over by its President, F. O. Earnshaw. This group was addressed by

two able speakers, Burton A. Ford of New York City, and Dr. J. W. White, Professor of Soil Technology, in Charge of Soil Research, Pennsylvania State College, State College, Pa. Dr. White gave an informative address on "The Development of our Agricultural Lime Market and Its Value to the Farmer," and was followed by Mr. Ford who gave a decidedly interesting discussion on "The Trade Association as a Stabilizer." It was deemed advisable not to hold the business meeting which was scheduled to follow the presentation of these two papers. Announcement was made that this meeting would be held in the near future at the call of the President.

As a climax to the social activities of the convention, the Fifteenth Annual Banquet was held in the grand ballroom of the William Penn Hotel on Thursday evening, and in order to avoid the possible indictment that we are unduly exaggerating, let us say that this occasion suffered not in the least in contrast with our previous banquets. Paul B. Reinhold was delegated the exacting responsibility of toastmaster. Mr. Reinhold, with his keen and ready wit, did credit to President Worthen's judgment in selecting him for this difficult post.

For many years our industry has enjoyed a close and helpful contact with the U. S. Bureau of Mines. It was, therefore, particularly pleasing to us to have Scott Turner, Director of the Bureau, accept our invitation to present, at the annual banquet, the awards for the safety competition conducted among the members of the Association during 1930. We are distinctly aware of the demands which are necessarily made upon the director of a large governmental bureau, and this knowledge makes us doubly appreciative of the sacrifice which Mr. Turner must have made to be with us at the banquet. In awarding the trophy to the Cape Girardeau Limestone Quarry of the Marquette Cement Mfg. Co., located at Cape Girardeau, Missouri, winner of the contest for 1930, Mr. Turner pointed out that this was the third consecutive time that this particular quarry had won the contest, and that therefore, under the rules of the competition, they are permitted to retain permanent possession of the bronze trophy donated by *The Explosives Engineer*. In the course of his remarks Mr. Turner pointed out that accident prevention in the crushed stone industry has reached such a stage of perfection that no company can confidently expect to be the leader, unless it can operate its plants with no accidents to any employees. The trophy was accepted on behalf of the winner by E. M. Gould, Superintendent of the Cape Girardeau Limestone Quarry of the Marquette Cement Mfg. Co. In accepting the trophy Mr. Gould remarked that the intrinsic value of the trophy is small, but the achievement of which it is a memento is truly great. He said it stands out as a challenge to every quarry organization to eliminate accidents, and that it also stands out as a monument to the fact that this can be done. In

addition to the winner of the contest, the following plants also made perfect records in the competition for 1930 and were accordingly entitled to receive parchment reproductions of *The Explosives Engineer* award:

Holston Limestone Quarry of the American Limestone Company, Mascot, Tenn.
 Rock Hill Trap Rock Quarry of the General Crushed Stone Company, Rock Hill, Pa.
 Spore Limestone Quarry of the National Lime and Stone Company, Spore, Ohio.
 Nos. 5 and 6 Limestone Quarries of the North American Cement Corporation, Martinsburg, W. Va.
 Holland Limestone Quarry of the France Stone Co., Maumee, Ohio.
 Security Limestone Quarry of the North American Cement Corp., Security, Md.
 Jamesville Limestone Quarry of the General Crushed Stone Company, Syracuse, N. Y.
 No. 2 Limestone Quarry of the Southwest Stone Co., Chico, Texas.
 North Baltimore Limestone Quarry of the France Stone Co., North Baltimore, Ohio.
 Ridgeville Limestone Quarry of the Mid-West Rock Products Corp., Ridgeville, Ind.
 Spencer Limestone Quarry of the Mid-West Rock Products Corp., Spencer, Ind.
 Kenneth Limestone Quarry of the France Limestone Co., Logansport, Ind.
 Rocky Hill Trap Rock Quarry of The Connecticut Quarries Co., Inc., Rocky Hill, Conn.
 Mt. Carmel Trap Rock Quarry of The Connecticut Quarries Co., Inc., Mt. Carmel, Conn.
 Plant "R" (Wyandotte County, Kansas) Stewart Sand & Material Co., Kansas City, Mo.
 Sparks Quarry of the Kentucky Consolidated Stone Co., Mt. Vernon, Ky.

Certificates of award were presented at the annual banquet to Messrs. H. F. Yotter for the General Crushed Stone Co., F. H. Edwards for The Connecticut Quarries Co., Inc., and W. F. Wise for the Southwest Stone Co., who were the only representatives of winning companies present.

To James Montgomery Beck, United States Congressman from Pennsylvania, former Solicitor General of the United States, and the honored guest of the evening, we are indebted for a charming, brilliant and highly entertaining address. Congressman Beck does honor to any occasion which he graces and it was a delightful pleasure to have him with us at Pittsburgh.

As the following speaker on the banquet program, we were given a talk in lighter vein by Douglas Malloch, who, besides entertaining us with his wit and humor, quoted from a number of his better known poems.

At the conclusion of the banquet program, Toastmaster Reinhold announced the winners in the Manufacturers' Division Exposition Contest. The silver loving cup presented to the exhibitor voted as having the most appropriate exhibit was awarded the General

Electric Co., Schenectady, New York, whose exhibit of audible sound and visible light had aroused much interest. The Niagara Concrete Mixer Co. of Buffalo, New York, and the Bucyrus-Erie Co., South Milwaukee, Wis., were awarded first and second honorable mention, respectively.

The winners of the prizes for active members who succeeded in filling their cards with stickers obtained by visiting each exhibitor's booth were announced as follows:

Frank J. Long, West Roxbury Trap Rock Co., West Roxbury, Mass.
 E. E. Dotter, General Crushed Stone Co., Glen Mills, Pa.
 H. W. Craig, John T. Dyer Quarry Co., Birdsboro, Pa.
 H. E. Rainer, Federal Crushed Stone Corp., Buffalo, N. Y.
 Albert D. Blakeslee, New Haven Trap Rock Corp., New Haven, Conn.

The first part of the concluding session of the convention, held on Friday morning and presided over by President Worthen, was devoted to the general subject of ready mixed concrete. There is a very attractive market for this product in the field of municipal work according to Henry P. Johnson, Jr., Construction Engineer, Division of Bridges and Structures, Department of Public Works, Pittsburgh, Pa., who presented his ideas on this subject to us in a paper entitled "Pre-mixed and Delivered Concrete Has a Large Field in Municipal Work."

The second subject, "Manufacturing and Selling Ready Mixed Concrete," was presented by one of the largest ready mixed concrete operators in the country, J. L. Shiely, President, J. L. Shiely Co., St. Paul, Minn. Mr. Shiely is also Treasurer of the National Ready Mixed Concrete Association, which held its second annual convention during the week following ours. The experience which Mr. Shiely has gained in operating his ready mixed concrete plants should prove a most valuable background to anyone having under consideration this form of activity.

The discussion of the two preceding papers was led by J. E. Burke, General Manager, The Ready Mixed Concrete Co., Pittsburgh, Pa., and President, National Ready Mixed Concrete Association. To those in ready mixed concrete production, the importance of these three discussions cannot be overemphasized. They will be available in the printed proceedings of the Pittsburgh Convention, and should be read with distinct interest.

The fourth speaker on the Friday morning program was W. B. Burruss, internationally known business counsellor, who addressed us on "Start from Where You Stand." Mr. Burruss gave us a truly significant and inspirational talk which was very much appreciated by those who had the pleasure of hearing him.

To the large number present interested in the production of railroad ballast, the address on "Present

(Continued on page 27)



Abe Goldberg,
Allis-Chalmers Manufacturing Co.,
Milwaukee, Wis.

Newly Elected Chairman,
Manufacturers' Division



Bruce G. Shotton,
Hendrick Manufacturing Co.,
Pittsburgh, Pa.

Retiring Chairman.

Manufacturers' Division Elects Abe Goldberg Chairman

THE Manufacturers' Division of the National Crushed Stone Association held its annual business meeting during the Fifteenth Annual Convention of the Association at the William Penn Hotel, Pittsburgh, Pa., January 19-22, 1932. The Division gathered for dinner on the evening of Wednesday, January 20, and immediately following, the annual meeting was formally called to order by the Chairman, Bruce G. Shotton. There being no corrections made to the minutes of the previous meeting held at the Hotel Jefferson, St. Louis, Mo., January 20, 1931, those minutes were duly approved. Chairman Shotton expressed his sincere appreciation of the loyal support and helpful cooperation which had been extended to him by the members of the Division during his administration, and in retiring as chairman pledged his continued help in whatever way he might be of assistance. Bruce Shotton is deserving of the highest praise for his work as Chairman of the Division. Under present circumstances it was inevitable that the membership of the Division would suffer some loss during the past year, and but for the untiring and constant efforts of Bruce this situation might have approached serious proportions. His unassuming modesty and quiet, retiring nature sometimes obscure the fact that he is a zealous and energetic worker, and in the discharge of his duties as Chairman he has given of his time and made personal sacrifices far beyond what might reasonably have been expected. He took office under particularly trying circumstances and we feel is deserving of the highest praise for the commendable manner in which he served the Division and the National Association.

Chairman Shotton called upon C. H. Adamson, Chairman of the Resolutions Committee, for his report which resulted in the unanimous adoption of the following resolution:

RESOLVED, That the Manufacturers' Division of the National Crushed Stone Association extends sincere thanks and appreciation to:

President A. L. Worthen.

Secretary J. R. Boyd.

J. E. Gray and the entire personnel of the Washington Office.

Frank Andrews, Manager, William Penn Hotel, and his staff of efficient assistants.

The Adams Transfer Co. and to the

Pennsylvania Stone Producers' Association, Mr. F. O. Earnshaw, President and Mr. Paul B. Reinhold, Secretary.

BE IT FURTHER RESOLVED, That these resolutions be made a permanent part of the record of this meeting.

A special committee was appointed by the chair, consisting of C. B. Andrews and H. M. Davison, who were

◆New vice-chairmen and directors named at annual meeting held during Pittsburgh Convention.

instructed to personally wait upon and invite A. L. Worthen, President of the National Crushed Stone Association, to say a few words to the meeting.

During the absence of this committee in the discharge of its duties, Chairman Shotton asked for the report of the Nominating Committee, by its Chairman, M. B. Garber. The Nominating Committee was confronted by a particularly difficult task in determining upon a selection for Chairman for the ensuing year. It realized at the outset of its deliberations that a number of men were well qualified and highly deserving of this honor. In finally determining upon Abe Goldberg, Allis-Chalmers Mfg. Co., as the new Chairman, none will deny the wisdom of the Nominating Committee. The Allis-Chalmers Mfg. Co. has been identified with the Manufacturers' Division since its inception. From that time to this date, it has been a loyal and enthusiastic supporter of the Division as well as the National Association and during this period Abe has made countless friends in the Division as well as in the industry which his company serves. As was the case with Mr. Shotton, he is undertaking the responsibility of guiding the Division through what gives every indication of being a troublesome year. We have full confidence, however, that with the continued loyal and enthusiastic support of the members of the Division, he will be able to do justice to the confidence which has been placed in him.

The report of the Nominating Committee was unanimously approved and resulted in the election of the following officers and members of the Board of Directors:

Vice-Chairmen—

C. H. Adamson, Stephens-Adamson Mfg. Co., Aurora, Ill.

Lucius Beebe, Troco Lubricating Co., Philadelphia, Pa.

C. S. Huntington, Link-Belt Co., Chicago, Ill.

Thos. MacLachlan, Vulcan Iron Works, New York City.

W. S. Nicol, Cross Engineering Co., Carbondale, Pa.

Representing Manufacturers' Division on the National Board of Directors—

Abe Goldberg, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

B. G. Shotton, Hendrick Mfg. Co., Pittsburgh, Pa.

L. W. Shugg, General Electric Co., Schenectady, N. Y.

Board of Directors of the Manufacturers' Division—

Abe Goldberg, Chairman, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

C. H. Adamson, Stephens-Adamson Mfg. Co., Aurora, Ill.

E. C. Bauer, Kensington Steel Co., Chicago, Ill.

Lucius Beebe, Troco Lubricating Co., Philadelphia, Pa.

E. C. Brown, Good Roads Machinery Co., Kennett Square, Pa.
 Gordon Buchanan, C. G. Buchanan Co., Inc., New York City.
 H. M. Davison, Harnischfeger Sales Corp., Milwaukee, Wis.
 Geo. M. Dyke, Stearns Conveyor Co., Cleveland, Ohio.
 J. C. Farrell, Easton Car & Construction Co., Easton, Pa.
 H. T. Gracely, Marion Steam Shovel Co., Marion, Ohio.
 L. D. Hudson, Nordberg Mfg. Co., Milwaukee, Wis.
 C. S. Huntington, Link-Belt Co., Chicago, Ill.
 Max S. Lambert, Robins Conveying Belt Co., Chicago, Ill.
 Thos. MacLachlan, Vulcan Iron Works, New York City.
 W. H. Milroy, Earle C. Bacon, Inc., New Haven, Conn.
 W. S. Nicol, Cross Engineering Co., Carbondale, Pa.
 W. J. Piggott, W. S. Tyler Co., Cleveland, Ohio.
 S. R. Russell, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.
 B. G. Shotton, Hendrick Mfg. Co., Pittsburgh, Pa.
 L. W. Shugg, General Electric Co., Schenectady, N. Y.
 Carl Swanson, Illinois Powder Mfg. Co., St. Louis, Mo.
 F. B. Ungar, Ludlow Saylor Wire Co., St. Louis, Mo.
 E. L. Wettlough, Niagara Concrete Mixer Co., Buffalo, N. Y.

In accepting the office of Chairman, Abe gratefully acknowledged the honor which had been conferred upon him and pledged his every effort to advancing the interests of the Manufacturers' Division and the National Crushed Stone Association for the coming year.

Following the election of officers, the committee appointed to personally invite President Worthen to the meeting, escorted him to the platform. President Worthen thanked the Division for its generous support during the past year and said in part, "The exposition is unusually good under present conditions. To be sure there are not as many exhibits as we have had in the past, but the set-up is very attractive this year. I think my company obtains a full return for everything that it costs to bring our representatives here, through the ideas which they develop from an inspection of the exposition."

At the conclusion of President Worthen's remarks, there being no further business the meeting was declared adjourned.

Before closing this brief article we wish to record, in terms of the highest praise, appreciation for the Manufacturers' Division Exposition of Quarry Equipment, Machinery and Supplies held in conjunction with the Fifteenth Annual Convention of the Association in Pittsburgh. The exposition, though participated in by a somewhat smaller number of exhibitors compared very favorably, considering present conditions, with expositions held in previous years. There was a pronounced increase in interest on the part of the various operating men present at Pittsburgh and to us this is not only a gratifying condition, but also a very natural one. In the present economic situation every means must be developed for cutting out unnecessary expense and introducing all possible economy in production operations. The producers of crushed stone realize the excellent opportunity afforded them by the

Manufacturers' Division Exposition to become personally acquainted with the latest developments and improvements in the equipment and machinery used in the production of crushed stone. They further recognize the opportunity which the exposition gives them of having consultation with the technical representatives of the various companies present. Even though conditions in the William Penn Hotel were such that it was impossible to have the exposition held on the same floor with other convention activities, we feel that the general consensus of opinion among exhibitors was that the attendance was gratifying and well repaid them for their efforts in having an exhibit at Pittsburgh.

For the following detailed account of the various exhibits on display we are indebted to *Pit and Quarry*, whose description appeared in their January 27 issue:

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

A photographic display of the Newhouse crusher and vibrating screens. Also a display of Rollway cylindrical roller bearings and descriptive literature.

American Manganese Steel Co., Chicago Heights, Ill.

A complete line of manganese-steel dipper teeth, chains, sprockets, etc., as well as photographs and descriptive literature.

Earle C. Bacon, Inc., New York, N. Y.

A panel showing a typical jaw crusher and a crosssection showing its various features. Also a miniature operating model, photographs and literature.

Bucyrus-Erie Co., South Milwaukee, Wis.

Operating models of a walking dragline and a 120-B shovel, photographs and booklets of the company's entire line. A guessing contest as to the weight of a large rock exhibited in the booth attracted considerable attention.

Burton Explosives, Inc., Cleveland, O.

Descriptive literature, booklets and photographs.

Cross Engineering Co., Carbondale, Pa.

Samples of carbon and manganese-steel perforated screens, of all sizes. Also descriptive literature.

E. I. duPont de Nemours and Co., Inc., Wilmington, Del.

Photographs and literature and copies of *Explosives Service Bulletin* and blasting handbook.

Fate-Root-Heath Co. (Plymouth Locomotive Works), Plymouth, O.

Attractive black and gold curtain display, photographs of various types and sizes of locomotives and descriptive literature.

Flannery Mfg. Co., Pittsburgh, Pa. (Exclusive sales agents for Detachable Bit Corp. of America.)

Exhibited detachable air-drill bits, photographs of bits in use in quarries and descriptive literature.

Frog, Switch & Mfg. Co., Carlisle, Pa.

Exhibited various track accessories and parts and literature.

General Electric Co., Schenectady, N. Y.

Exhibited Thyatron-tube organ, Aten-Quadrillron Fold amplifier, thruster, photoelectric relay, Thyatron-tube speed trap and a totally-enclosed fan-cooled motor. Literature. This exhibit was very popular and was voted the association's prize of a silver loving cup as the best exhibit.

Hardinge Co., Inc., York, Pa.

Attractive operating model of conical scrubber and screen and a clarifier operating in conjunction with it. Photographs and literature.

Harnischfeger Corp., Milwaukee, Wis.

Moving picture of shovel in operation, photographs and descriptive literature.

Hendrick Mfg. Co., Carbondale, Pa.

Display racks of various sizes and types of perforated metal screens. Descriptive literature.

Hercules Powder Co., Wilmington, Del.

Exhibited jar full of caps and held contest as to number it contained. Cash prizes were awarded to the winners. Also photographs and descriptive literature.

Jaeger Machine Co., Columbus, O.

Photographic panel of truck mixers in operation and descriptive literature.

Kennedy-Van Saun Mfg. & Engr. Co., New York City.

Cross-section panel of gearless gyratory crusher and operating model of crusher. Also photographs and descriptive literature.

Kensington Steel Co., Chicago, Ill.

Photographic display of dipper teeth, elevator buckets, sprockets, chain, hammer-mill parts, etc., and literature.

Koppers Products Co., Pittsburgh, Pa.

Had a miniature circular track, one half coated with non-tar bituminous material, the other half with Tarmac. Electrically-propelled miniature motor cars running on this wet surface demonstrated comparative non-skid qualities. Descriptive literature.

Ladel Conveyor & Mfg. Co., New Philadelphia, O.

Full-size operating units of Summit screens, also conveyor idlers, photographs and literature.

Link-Belt Co., Chicago, Ill.

Photographic display of plants and products, model Shaw classifier, sample conveyor idlers, speed reducer, pan conveyor and full-sized single-deck vibrating screen. Literature.

Ludlow-Saylor Wire Co., St. Louis, Mo.

Wall and revolving stand displays of various types and sizes of wire screen cloth. Descriptive literature.

Manganese Steel Forge Co., Philadelphia, Pa.

Samples of various types and sizes of wire screen cloth, both manganese and new hardened and tempered screen cloth, photographs and literature. Also sample decks of Rol-man rib

screen for heavy scalping service and rib screen with removable screen bars which can be replaced when worn out.

McLanahan & Stone Corp., Hollidaysburg, Pa.

Full-sized steel single-roll crusher, operating model of log washer, photographs and literature.

Marion Steam Shovel Co., Marion, O.

Photographic display of shovels in operation and descriptive literature. Also gave out pipes in the form of a shovel dipper as souvenirs.

National Crushed Stone Assn., Washington, D. C.

Copies of publications, pamphlets, etc. Someone in constant attendance to give information to visitors.

National Equipment Corp., Milwaukee, Wis.

Photographic display of installations, concrete mixers, mixer trucks, shovels, dippers, etc. Also miniature operating model illustrating mixing action of Smith truck-mixer body. Literature.

National Safety Council, Chicago, Ill.

Attractive display board of safety pamphlets and literature centered about the bronze National Crushed Stone Industrial Trophy.

Niagara Concrete Mixer Co., Buffalo, N. Y.

Large double-deck roller-bearing screen in operation. Photographs showing screens in operation and descriptive literature.

Nordberg Mfg. Co., Milwaukee, Wis.

Cross-sectional operating model of Symons cone crusher illustrating its method of operation and an attractive miniature of a complete crusher in operation. Also a photographic display and literature.

Ohio Power Shovel Co., Lima, O.

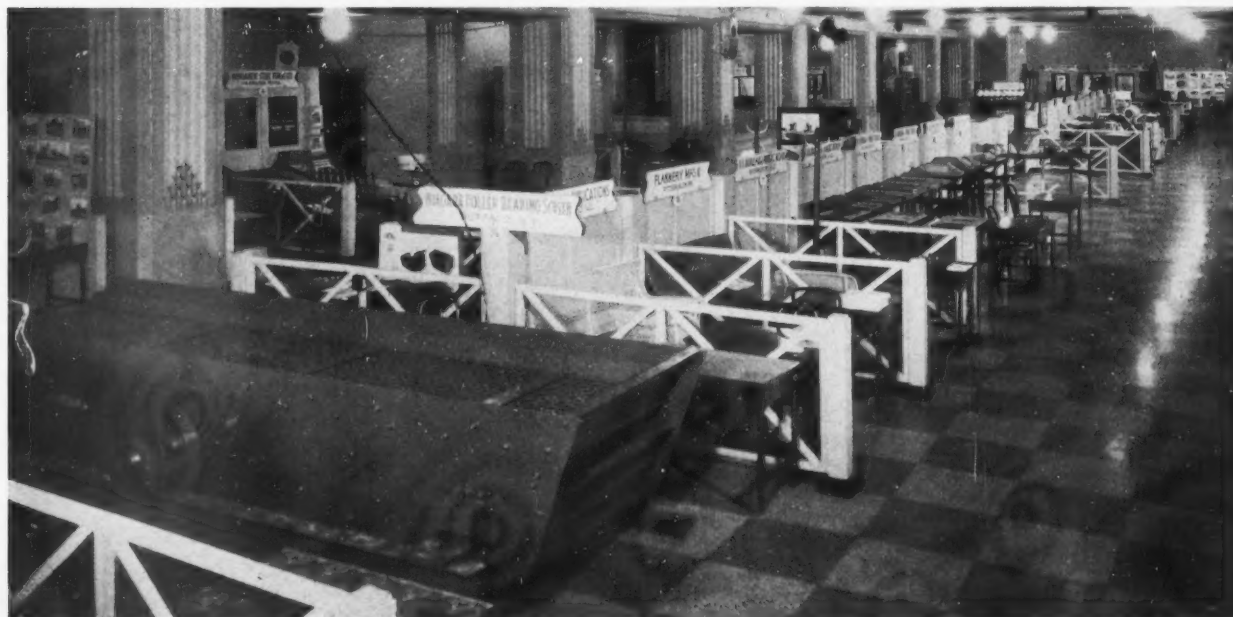
Large photographic display of shovel in operation and descriptive literature.

Pit and Quarry Publications, Chicago, Ill.

Copies of Annual Crushed Stone Section, Annual Review and Engineering Number, and Handbook and Directory.

H. K. Porter Co., Pittsburgh, Pa.

Photographic panel of steam, gasoline, gas-electric, oil-electric and fireless steam locomotives and descriptive literature.



A View of the Manufacturers' Division Exposition at Pittsburgh.

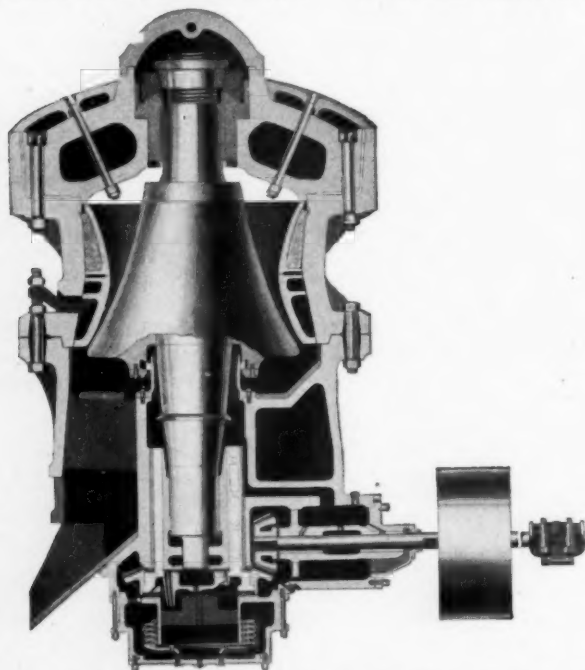
GREATER OUTPUT

OF SMALL SIZES AT

LEAST COST PER TON

Minimum of Waste Fines

MAINTENANCE NEGLIGIBLE



TZ REDUCTION CRUSHER

WITH PATENTED BELL HEAD AND CONCAVES

*The Machine Regarding Which a
Skeptical Purchaser Said:—*

*“***When you presented this type of crusher to me for consideration, I was skeptical as to its performance***. Upon your assurance***we placed the order with you and I am glad to state that it is one of the finest installations we have ever made.***Its performance has been a decided revelation to other operators.***”*

THERE ARE MANY REASONS

SEE BULLETIN 1110

**TRAYLOR ENGINEERING
& MANUFACTURING CO.**
ALLENTOWN, PENNSYLVANIA

NEW YORK CHICAGO LOS ANGELES
2513 Empire State Bldg. 1414 Fisher Bldg. 908 Chester Williams Bldg.
SALT LAKE CITY SEATTLE
101 W. 2nd South St. 815 Alaska Bldg.
TIMMINS, ONTARIO, CANADA, Moore Block
Export Department, 104 Pearl St., New York City—Cable Address: “Forsaltra”

Robins Conveying Belt Co., New York City.

Photographic display of new plants built recently, also of apron feeders, vibrating screens, belt conveyors, elevators, roll grizzlies and other equipment. Literature.

Rock Products, Chicago, Ill.

Copies of Annual Review Number, *Concrete Products* and other literature.

Sauerman Bros., Inc., Chicago, Ill.

Operating models of cableway excavator, Crescent scraper operated with hoist and posts and one operated by a crawler crane. Descriptive literature.

Simplicity Engineering Co., Durand, Mich.

New Model B double-deck, heavy-type direct-drive vibrating screen with new resilient rubber mountings and compensator on drive shaft for adjusting to load. Catalogs and photographs of screens and disintegrator.

Stearns Conveyor Co., Cleveland, O.

Photographic display of Rex agitator and mixer trucks and samples of belt conveyor idlers and section of pan conveyor. Descriptive literature.

Stephens-Adamson Mfg. Co., Aurora, Ill.

Attractive colored panel of belt-conveyor and drive and photos of plants, conveyors, feeders, screens, grizzlies, etc. Literature.

Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Samples of manganese-steel dipper teeth, sheaves, crawler treads, chain, elevator buckets, crusher concaves, and Timang woven-wire screen cloth. Literature.

The Thew Shovel Co., Lorain, O.

Photographic display and literature on complete line of shovels, etc.

Traylor Engr. & Mfg. Co., Allentown, Pa.

Cross-sectional model of gyratory crusher with bell head and concaves and model of crusher shaft. Photographs and literature.

Troco Lubricating Co., Philadelphia, Pa.

Samples of regular and special-waterproof greases and literature.

The W. S. Tyler Co., Cleveland, O.

Panel display of various types and sizes of screen cloth, photographs and literature. Also Ro-tap sieve shaker, Hummer vibrating screen, and Ty-Lab tester in operation.

F. M. Welch Engineering Service, Inc., Greenville, O.

Photographic display of Greenville stackers in operation and attractive miniature operating model of Allswede scrubber.

West Process Pavement Co., Louisville, Ky.

Samples, photographs and literature.

Woodford Engineering Co., Chicago, Ill.

Photographs illustrating remote-controlled electric quarry-haulage systems in operation and descriptive literature.

U. S. Bureau of Mines, Washington, D. C.

Photographic display of new apparatus for measuring and precisely recording earth vibrations. Also photographic display of chief causes of fatalities and injuries and informative circulars on various quarry operations.

U. S. Bureau of Public Roads, Washington, D. C.

Models of various types of brick, concrete, bituminous concrete, bituminous macadam, surface-treatment, gravel, stone, and other types of roads so constructed as to show their method of construction. Also model bridges, culverts, grade separations, etc.

Crushed stone has long had recognized merit for use as railroad ballast even under heavy traffic. This is so because of its angularity which makes possible the interlocking of the fragments and in consequence a high degree of stability results.

Where the Highway Dollar Goes

A STUDY to determine the extent to which expenditures for highway improvement provide employment has just been completed by the Bureau of Public Roads of the U. S. Department of Agriculture. Concrete pavement was selected for this study because it is a widely used type, and because the effect of expenditures for pavements of this type in providing employment is believed to be typical of the effect produced by expenditures on other high-type pavements. The effect in this field also appears to be typical of that produced by expenditures for public works generally.

All forms of construction have a wider influence on employment than appears generally to be recognized, though the points at which this influence is applied differ. An expenditure for the erection of a steel bridge probably results in about the same gross payment to labor as the same expenditure for a concrete pavement but the distribution of the payments that are made to labor affect a somewhat different group of industries and in neither case is the distribution the same that results from the construction of a monumental building. But this is of little consequence, for, though this distribution reaches different industries, in all of these cases the general effect on business and on employment appears to be about the same.

In making this study, expenditures were traced through the various industries that are affected by them and the amounts paid as wages and salaries were set aside for accumulation. In the end, labor was found to receive the larger part of these expenditures, which is an altogether reasonable conclusion, since the materials entering into highway construction are of little value in their original state. Practically all of the value which the finished pavement possesses is created by the application of labor directly and through manufacturing processes and transportation.

For the purpose of indicating how labor creates the value of the finished concrete pavement, the following primary sub-division of its cost was made:

1. The direct cost of laying concrete pavement (production expense)
 - a. Labor
 - b. Aggregate
 - c. Cement
 - d. Steel
 - e. Equipment

These items cover the labor employed in connection with the various operations incident to laying the pavement, the cost of the materials of which the pavement is composed, and the costs represented by the equipment used.

2. Expense, other than for production, incurred in connection with laying concrete pavement
 - f. Getting onto job and installation of plant
 - g. Bonds and insurance

The first of these items covers the preliminary expenses incident to this work such as the cost of getting equipment onto the job, the cost of employing men, the cost of developing a working organization, et cetera. The second item covers the cost of bonds and insurance and all closely related costs.

3. Job margin
 - h. Overhead
 - i. Financing
 - j. New profit

Such items as overhead (which includes central office salaries, rented quarters, the cost of bidding, etc.) and the cost of financing must be paid out of the job margin. After these and related expenses are satisfied, the remainder is the net profit on whatever money is invested in the enterprise.

An extended analysis of the cost of laying concrete pavement in three typical states during the calendar year 1929 produced the following distribution of cost among the above-named items:

TABLE 1

	Cents per sq. yd.	Dollars per \$1000 of expenditure
Item a. Labor	\$0.26	\$141
Item b. Aggregate	0.60	324
Item c. Cement	0.60	324
Item d. Steel	0.05	27
Item e. Equipment	0.18½	100
Item f. Getting onto job and installation of plant.....	0.05	27
Item g. Bonds and insurance.....	0.04	22
Items i. } Job margin	0.06½	35
Item j. }		

In order to ascertain the amount of labor involved in each of these items (except Item a, which already is a labor item), the study included an intensive analysis of their component parts. This analysis resulted in a distribution of the costs these items involve under nine headings—labor, freight (principally railroad freight), materials and supplies, fuel, interest, taxes, depreciation and repairs, depletion and profit. Freight charges cover both the cost of delivering finished materials to the materials yard of the job and the cost, if any is involved, of accumulating the raw materials, fuel, etc., used in producing such manufactured materials as cement and steel. The details of these analyses are not repeated here but the results appear in Table 2.

TABLE 2

Summary of the various steps through which the contractor's payment of \$1000 are traced, and the amounts attributable to each.

Item	Salaries and wages	Freight	Materials and supplies	Fuel	Interest	Taxes	Depreciation and repairs	Depletion	Profit
a. Salaries and wages.....	\$141.00								
b. Aggregate	50.00	\$194.00	\$ 18.00	\$ 11.00	\$ 4.00	\$ 6.00	\$ 29.50	\$ 7.50	\$ 4.00
c. Cement	61.00	113.50	30.00	22.50	4.50	5.00	53.50	3.00	31.00
d. Steel	6.00	6.20	8.50	1.50	0.40	0.90	2.50		1.00
e. Equipment	5.20	4.50	10.65	0.50	0.20	7.20	70.65		1.10
f. Getting onto job.....	13.50	13.50							
g. Bonds and insurance.....	11.00								1.00
h. Job margin	15.00				5.00	5.00			10.00
** Adjustments	\$302.70	\$331.70 +75.00	\$ 67.15 -50.00	\$ 35.50	\$ 14.10	\$ 24.10	\$156.15 -25.00	\$ 10.50	\$ 48.10
	\$302.70	\$406.70	\$ 17.15	\$ 35.50	\$ 14.10	\$ 24.10	\$131.15	\$ 10.50	\$ 48.10

* Set aside for later redistribution.

** These adjustments are made here to avoid recasting the freight analysis on account of the freight charges which are a part of the cost of repairs, replacements, materials and supplies.

If this item (freight) is distributed on the theory that the railroads handle this business, the distribution shown in Table 2 reduces to that shown in Table 3. While by far the larger part of this freight is handled by the railroads, a little moves by water and a somewhat larger volume is moved in trucks. However, substantial accuracy is preserved if all of it is treated as railroad business.

The largest single item in Table 2 is "Freight—\$406.70," which is about 40 per cent of the cost of concrete pavement construction. Of this amount \$313.70 is for transportation of aggregate, cement and steel. It covers the collection of the components of these materials prior to their manufacture, and the shipment of the material to the construction jobs. The cost of assembling the materials out of which they are built is nearly a third of the total cost of concrete pavements. The remainder of the freight charge is for the equipment and the movement of the numerous materials that enter into the manufacturing processes and sub-processes other than those noted above.

TABLE 3

1. Salaries and wages	\$ 477.70
2. Materials and supplies	57.55
3. Fuel	57.20
4. Interest	61.70
5. Taxes	49.70
6. Depreciation and repairs	184.65
7. Profit	91.00
8. Depletion	10.50
9. Redistribution	10.00
	\$1000.00

The cost of fuel as shown in Table 3 is distributed between the remaining items, Table 4 results.

From the last of these tables it is clear that although job labor receives only a little more than 15 per cent of the sum expended on the construction of a concrete

pavement (see Items a and f of Table 2), the labor involved in producing the materials of which such pavements are constructed, in transportation and in obtaining the necessary fuel, is so large that the distribution to salaries and wages on account of these phases of the construction of such pavements is well in excess of half of its total cost.

TABLE 4

1. Salaries and wages	\$ 516.00
2. Materials and supplies	64.20
3. Interest and rents	63.75
4. Taxes	51.40
5. Repairs and depreciation	188.75
6. Profit	91.00
7. Depletion	14.90
8. Redistribution	10.00
	\$1000.00

Of the other items that appear in Table 4, there are three, "Repairs and depreciation," "Materials and supplies" and "Taxes" which evidently involve a large expenditure for salaries and wages. The ramifications of the first two of these classifications involve so many manufacturing processes that a more generalized analysis was applied to their reduction. However, though more generalized, the line followed was the same as that used in examining the expenditures of which there is more exact knowledge. This analysis is not repeated here but when Table 4 is amended in the light of this analysis and in the light of the use made of taxes in paying employees and purchasing materials, it is found that as these payments filter through the various industries affected by them, something more than three-quarters of the money paid to contractors is converted into salaries and wages and less than one-quarter becomes the property of owners, who receive it in the form of interest, rents, royalties and profits.

This is about as far as the quantitative analysis may be carried with approximate certainty. But, although the quantities become somewhat doubtful, there is still a further share for labor in the last quarter of the expenditure.

The preceding quantitative discussion is based on a period of unusual business activity. In times of depression such as the present, the residue composed of interest rents, royalties and profits shrinks both in absolute amount and in relation to the total. In view of this well-known fact, it seems probable that, of the total expenditures for road construction at the present time, nearer 85 than 75 per cent may be thus directly traced into the hands of labor. Beyond this, there is still to be considered the fact that a part of the money paid to owners is immediately reinvested or expended, even in periods of depression, although a greater part is certainly so used in more prosperous times. And since, of the money so reinvested in productive industry, labor again receives the major part, it is not unreasonable to suggest that as much as 90 per cent and probably more of the original expenditure for a concrete pavement ultimately finds its way into wages and salaries and that this percentage is not greatly changed by the turn of the cycle from prosperity to depression and back again.

(Continued from page 19)

Trends in Railroad Ballast Specifications," by A. P. Crosley, Chairman, Committee II—Ballast of the American Railway Engineering Association and Division Engineer, Reading Company, Harrisburg, Pa., proved of exceptional interest. In his talk Mr. Crosley extended to the National Crushed Stone Association the hearty and sincere thanks of the Ballast Committee of the A. R. E. A. for the valuable assistance which has been rendered by the Association.

Following Mr. Crosley, A. T. Goldbeck, Director of our Bureau of Engineering, presented the results of the investigation on railroad ballast conducted in the laboratory of the Association.

Reports were then received from W. R. Sanborn, Chairman of the Transportation Committee, Max A. Altgelt, Chairman of the Committee on Resolutions and Wm. E. Hilliard, Chairman of the Auditing Committee.

As the last speaker of the concluding session, Otho M. Graves presented a summary entitled, "Highlights of the Convention." Because of the lateness of the hour, Mr. Graves limited his remarks to a few brief comments.

There being no further business to come before the meeting, the Fifteenth Annual Convention of the National Crushed Stone Association was officially declared adjourned by President Worthen.

If there was any one thing about the Pittsburgh meeting which seemed to stand out above all others, it was the decided increase in interest which was obvious at the business sessions of the convention. The delegates this year, more than ever before, seemed to have come to the meeting with the very definite and positive intention of getting the greatest possible benefit from the various papers and discussions. This is certainly a distinctly gratifying trend and we can promise you in advance that every effort will be made to make our next and Sixteenth Annual Convention of even greater value and interest than was the Pittsburgh meeting.



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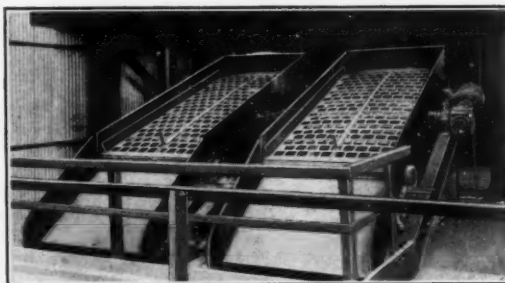
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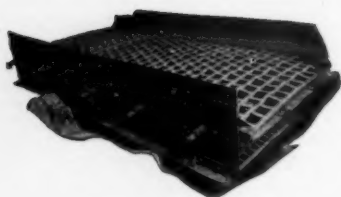
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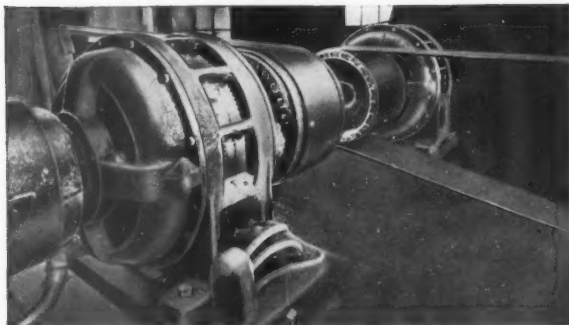
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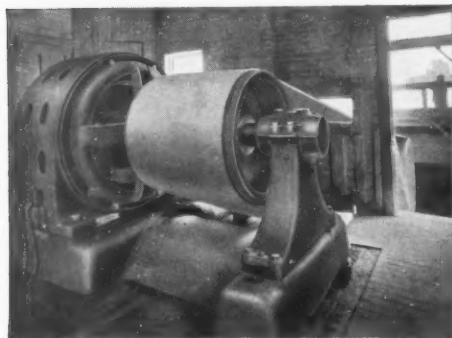
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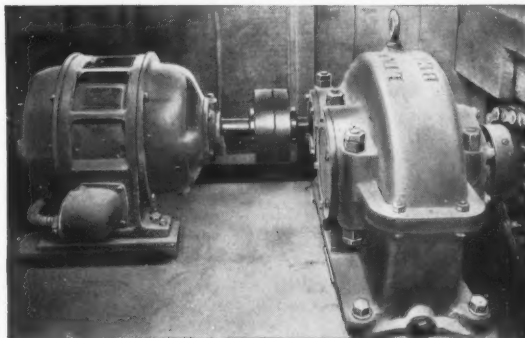


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